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Analytical Chemistry

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Oral Presentation

Monitoring Volatile Organic Compounds Removal by Indoor Plants

Volatile organic compounds (VOC's) are an extensive class of chemical compounds which exist as gasses at ambient standard temperature and pressure. The health risks associated with this broad class of chemicals range from tiredness and acute nausea to central nervous system damage and cancer. VOC's are found in much higher concentrations in indoor environments than outdoors, with particularly high concentrations in new buildings. Our investigation Aimed to monitor the reduction of VOC's by naturally occurring biochemical pathways found in plants. Using solid phase microextraction (SPME) coupled to gas chromatography-mass spectrometry, the rate of VOC decay in an airtight sampling apparatus was measured using five common household plants. The plants selected included three CAM plants including *Guzmania lingulata*, *Cassula argentea*, *Consolea facata*, and two C3 plants including *Chlorophytum comosum* and *Dracaena fragrans*. Three treatment conditions were applied to each plant to isolate active VOC uptake mechanisms covering the base of the plant in foil, no foil, and the use of a light. Of the five plants, *Guzmania lingulata* showed the greatest overall VOC uptake in Light treatment conditions with more than 80% removal of six of the eight target VOC compounds over a twelve-hour sampling period. All the plants tested showed less than 50% removal of dichloromethane or trichloromethane over the twelve-hour sampling period. The findings from this study suggest that certain plants have the capacity to remove airborne VOC's, but the efficacy of removal depends on chemical compounds and the mechanism of uptake utilized by each plant. VOC reduction varied, but ubiquitous among all plants that were tested. These promising results will hopefully help to choose the right plants for buildings based on type of potential volatile organic compounds.

Keywords: Volatile Organic Compounds (VOC's), Solid phase microextraction (SPME), VOC removal, Plants.